

after mobile terminated or originated call processing (step S1). In this instance, the correlator sequentially sets zone determination spreading codes  $C2_{2A}$  and  $C2_{2A}$  of the current and adjacent zones in the same radio channels and measures the received signal levels (step S2) and determines if the zone of the maximum received signal level is the current radio zone (step S3). If so, the mobile station goes back to step S2. If not, the mobile station proceeds to step S4, wherein it indicates the radio zone of the maximum level (a new radio zone) to the current base station and requests hand-off.

In response to the hand-off request, the base station informs a new base station in the new zone of the current radio channel  $f2$  of the mobile station and requests an idle communication channel. The new base station selects, for instance, an idle channel ( $f2$ ,  $C2_2$ ) according to the above-mentioned rules and indicates it to the current base station, which transmits to the mobile station an in-service control signal which instructs channel switching to the idle channel.

In step S5, the mobile station switches to the specified idle channel ( $f2$ ,  $C2_2$ ). That is, the mobile station sets the frequency synthesizer 13S to the frequency  $f2$  and the spectrum spreading code  $C2_2$  in the correlator 14.

As described previously, when the selected channel is the hand-off-only channel ( $f2$ ,  $C2_3$ ), the new base station selects, immediately after the start of communication with the mobile station, an idle channel, for instance, ( $f2$ ,  $C2_2$ ) of other radio channel and sends to the mobile station an in-service control signal instructing in-zone channel switching to the idle channel. The mobile station determines if the channel switching instruction is sent thereto in step S6, and if so, it performs channel setting in step S5.

As described above, according to the first and second aspects of the present invention, in the spread spectrum cellular mobile communication system, a radio frequency is assigned in common to all radio zones and the mobile station hands off by determining the destination radio zone using one of the two correlators while maintaining communication at the common radio frequency using the other correlator; hence, it is not necessary, for determining the destination zone, to provide two receivers in the mobile station and to use a TDMA-like radio channel configuration. Furthermore, the current or visited zone at the time of transmission can be determined in a short time by the concurrent use of the two correlators to scan the spectrum spreading codes. Besides, according to the first and second aspects of the present invention, the band of each radio channel is chosen in accordance with the traffic volume of the lowest-traffic radio zone in the service area and each radio zone is assigned radio channels of a number corresponding to the traffic volume of the zone—this permits the provision of an efficient channel configuration.

In the spread spectrum cellular mobile communication system according to the second aspect of the present invention, when the same radio channel as that assigned to the adjacent zone is not found, that radio channel is provided as a hand-off-only radio channel; hence, the mobile station does not need to switch to another radio channel for the determination of the destination channel. This avoids the necessity of providing two receivers in the mobile station and forming a TDMA-like radio channel configuration. Incidentally, since the hand-off-only radio channel is used temporarily for hand-off, the number of spectrum spreading codes to be assigned to it may be small. In addition, since the nearest radio zone for hand-off can be determined simply by switching the spectrum spreading code without switching the radio frequency, two systems of transceivers need not be prepared.

While the embodiments according to the first and second aspects of the present invention have been described as applied to hand-off when the mobile station moves into a new radio zone, it is evident that the present invention is also effective in switching to another communication channel in the same radio zone when the channel quality of the current channel is degraded by interference or the like.

It will be apparent that many modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

What is claimed is:

1. A hand-off method for a spread spectrum cellular mobile communication system wherein a service area is split into a plurality of radio zones, a base station is provided in each radio zone, and a mobile station hands off a communication channel over which said mobile station is currently communicating from a base station to which said communication channel belongs to another base station in the same service area or a base station in another service area according to the movement of the mobile station and continues the communication;

said method comprising the steps of:

assigning a common radio channel to all radio zones in a service area, said common radio channel having a frequency common to all radio zones in the service area, each of the radio zones being assigned a number of radio channels corresponding to the traffic volume of said radio zone, said number of radio channels having different frequencies from one another;

assigning to said common radio channel, for each radio zone, spectrum spreading codes for control to define control channels and at least one spectrum spreading code communication to define a communication channel, said spectrum spreading codes being different from one another at least between adjoining radio zones;

providing a mobile station with at least two correlators; and, when the mobile station hands off a radio channel over which the mobile station is currently communicating by using one of said at least two correlators, causing the mobile station to perform the following steps:

switching the currently communicating radio channel to a communication channel of the radio channel common to all radio zones;

scanning, while continuing the communication using said one correlator, the spectrum spreading codes for control in each radio zone and measuring received signal levels thereof using the other correlator, and determining the radio zone having the highest received signal level among the measured received signal levels to be a destination radio zone;

informing the base station through which the mobile station is currently communicating of the determined destination radio zone to request a channel switching; and

setting a communication channel specified by the base station through which the mobile station is currently communicating in response to the channel switching request and continuing the communication through a base station in the destination zone.

2. A hand-off method for a spread spectrum cellular mobile communication system wherein a service area is split into a plurality of radio zones, a base station is provided in each radio zone, and a mobile station hands off a communication channel over which said mobile station is currently communicating from a base station to which said commu-